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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/729,816	12/06/2000	Takuji Matsumoto	200504US2	6963

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EXAMINER

OWENS, DOUGLAS W

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 10/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/729,816

Applicant(s)

MATSUMOTO ET AL.

Examiner

Douglas W Owens

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 August 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8, 15 and 17-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 2-6, 8, 15 and 17-22 is/are allowed.
- 6) ☒ Claim(s) 1, 7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over US patent No. 6,320,234 to Karasawa et al. in view of US Patent No. 6,080,655 to Givens et al. and admitted prior art.

Regarding claim 1, Karasawa et al. teach a semiconductor device (Fig. 1) comprising:

a substrate (10) having a first active region (16) of a first conductivity type and second active region (18) of a second conductivity type, the first and second active regions being disposed in a semiconductor region;

an isolation insulating film (20) between the first and second active regions;

a first interlayer insulating film (66) on the first and second active regions and a surface of the isolation insulating film;

a second interlayer insulating film (74) on the first interlayer insulating film; and

at least one wire on the second interlayer insulating film (Col. 6, lines 65 – 66).

Karasawa et al. do not teach that the first and second insulative films are oxides. In fact, Karasawa et al. is silent with respect the material used for the first and second insulative films. Givens et al. teach a semiconductor device interconnect structure (Fig.

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3c, for example), wherein the first and second insulating films (30, 54; Col. 4, lines 13 – 20 and 52 – 57) are oxides. It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the oxide insulator layers taught by Givens et al. into the device taught by Karasawa et al., since it is desirable to use known reliable insulative materials. Additionally, the selection of a known material based on its suitability for its intended use supported a *prima facie* obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

Karasawa et al. do not teach a silicon nitride layer on all upper surfaces of the first interlayer insulating film. Givens et al. teach a silicon nitride layer (52; Col. 4, lines 40 – 43) on all upper surfaces of the first interlayer insulating film. It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the nitride layer taught by Givens et al. into the device taught by Karasawa et al., since it is desirable to control etching of the contact holes, which is made possible with a nitride etch-stop layer.

Neither Karasawa et al., nor Givens et al. teach an SOI substrate. Admitted prior art teaches an SOI substrate (Fig. 22). It would have been obvious to one of ordinary skill in the art to incorporate the use of an SOI substrate since it is desirable to reduce parasitic capacitance, and prevent latch-up, thus increasing device operation speed. If the proposed modification were made, the resulting device would have further had a first semiconductor region between the isolation insulating film (20) and the surface of the insulative substrate.

Regarding claim 7, Karasawa et al. do not teach a device, wherein the silicon nitride film includes a silicon nitride film formed entirely on the first oxide except where contact holes are formed. Givens et al. teach a device, wherein the silicon nitride film is formed on the interlayer insulating film except a portion where contact holes are formed. It would have been obvious to one of ordinary skill in the art to incorporate the teaching of Givens et al. into the device taught by Karasawa et al. for reasons discussed above.

***Allowable Subject Matter***

3. Claims 2 – 6, 8, 15 and 17 – 22 are allowed.

***Response to Arguments***

4. Applicant's arguments filed August 11, 2004 have been fully considered but they are not persuasive.

5. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the silicon nitride over the first insulative film and not the second (emphasis added)) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

6. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does

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not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

7. In response to applicant's argument that without Applicant's invention, one having ordinary skill in the art would not use a silicon nitride etch stop layer on the first insulating layer, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). Karasawa et al. teach a via through an interlayer insulating layer. Givens et al. teach a silicon nitride etch stop layer on an interlayer insulating layer through which a via is formed. The silicon nitride etch stop layer has the desired etch selectivity for controlling the via etch. This is commonly done in the art and is desirable here for the purpose of controlling the via etch.

### **Conclusion**

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas W Owens whose telephone number is 571-272-1662. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C Lee can be reached on 571-272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DWO



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